Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1986 Tax Reform Act

The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1986 Tax Reform Act

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This paper uses a Treasury Department panel of more than 4,000 taxpayers to estimate the sensitivity of taxable income to changes in tax rates on the basis of a comparison of the tax returns of the same individual taxpayers before and after the 1986 tax reform. The analysis emphasizes that the response of taxable income involves much more than a change in the traditional measures of labor supply. The evidence shows an elasticity of taxable income with respect to the marginal net-of-tax rate that is at least one and could be substantially higher. The implications for recent tax rate changes are discussed.

Changes in marginal tax rates induce taxpayers to alter their behavior in ways that affect taxable income and therefore tax revenue. The magnitude of this response is of critical importance in the formulation of appropriate tax and budget policies. This paper reports new estimates of the sensitivity of taxable income to changes in tax rates based on a comparison of the tax returns of the *same* individual taxpayers before and after the 1986 tax reform. This comparison is done

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by using a panel of more than 4,000 individual taxpayers created by the Treasury. This is the first time in which panel data have been used to estimate the sensitivity of taxable income to marginal tax rates.

The Tax Reform Act of 1986 is a particularly useful natural experiment for studying the responsiveness of taxpayers to changes in marginal tax rates. The 1986 legislation reduced tax rates sharply for high-income individuals; the marginal tax rates of the highest-income individuals fell from 50 percent to 28 percent, raising their marginal net-of-tax income per dollar of pretax income by 44 percent (from 50 cents to 72 cents).

The analysis presented in this paper shows that there is a very substantial response of taxable income to changes in marginal tax rates. The estimated sensitivity implies that a change in income tax rates has substantially less impact on tax revenue than would be true if there were no behavioral response to marginal tax rates. This sensitivity of taxable income also implies that high marginal tax rates create significant deadweight losses by inducing taxpayers to act differently than they otherwise would.[1] Both implications are relevant to the design of appropriate tax policies and to choices about the desirable level of government spending.

Section I of this paper reviews some of the previous literature on the effects of income tax rates and discusses the importance of understanding how changes in tax rates induce taxpayers to alter their taxable income as a whole and not just their labor supply. Section II describes the data. Section III reviews the relevant features of the 1986 tax reform and discusses how the data will be analyzed to separate the effects of changes in marginal tax rates from the effects of the 1986 changes in tax rules.

The basic analysis is presented in Section IV, and the implied elasticities are presented and discussed in Section V. Section VI then applies the estimated elasticities to assess the likely effects of the 1993 increase in marginal tax rates. Section VII presents brief concluding comments.

I. The Effects of Tax Rates on Taxable Income

A change in individuals' marginal income tax rates can induce them to alter their taxable income in a wide variety of ways, including

[1] The behavioral changes induced by higher marginal tax rates include not only changes in labor supply but also a wide range of other changes discussed in Sec. I of this paper. All such changes in behavior involve deadweight losses to the individual because they alter the way in which potential income is spent (e.g., on leisure, fringe benefits, tax-deductible consumption such as charitable gifts, etc.). Feldstein (1995) shows that the change in taxable income is the correct measure of the deadweight loss.

changes in labor supply, in the form in which employee compensation is taken, in portfolio investments, in itemized deductions and other expenditures that reduce taxable income, and in taxpayer compliance.[2] Understanding the effect of tax rates on revenue requires assessing the response of overall taxable income and not just the effect on labor supply.

Economists and other analysts who are skeptical about the adverse effect of higher marginal tax rates on taxable income generally point to the literature on the effects of taxes on labor supply. Much of this literature shows that net wage rates have little effect on the labor force participation rate of adult males and on the average number of working hours of employed men (e.g., Pencavel 1986; MaCurdy, Green, and Paarsch 1990; Triest 1990). This evidence is incorrectly interpreted as indicating that high marginal rates have little effect on taxable income.

Although the current study deals with taxable income more generally, it is worth considering three reasons why this evidence on male participation and hours substantially understates the effect of tax rates on labor supply. First, most of the estimates ignore the nonlinearity of the income-leisure opportunity locus that results from the progressivity of the tax schedule and the existence of other household income (investment income and second-earner income). Second, female labor force participation and hours are much more sensitive to net wages and to taxes than male labor supply (e.g., Rosen 1976; Hausman 1985; Mroz 1987; Heckman 1993; Eissa 1995). Third, and perhaps most important, the studies focus on labor force participation and hours because those are the aspects of labor supply that are easily measured. In actual practice, individuals can vary their labor supply in the short run by changing how hard they work and in the long run by their location and the types of jobs that they accept. These dimensions of labor supply may be particularly important for higher-income individuals, who have substantial discretion about the intensity with which they work and for whom variations in effort can substantially affect income even if the number of hours is unchanged. Because this study focuses on income rather than hours and participation, its revenue elasticities will include the effect of effort that previous labor supply studies of hours and participation have implicitly ignored.

Variations in labor supply are not the same as variations in *taxable* labor income. High marginal tax rates encourage individuals to take

[2] The sum of an individual's income from all sources minus certain expenses and other "adjustments" is called adjusted gross income (AGI). Subtracting "itemized deductions" from AGI results in "taxable income."

their compensation for labor services in forms that are untaxed or subject to lower effective tax rates. Untaxed compensation includes traditional fringe benefits such as health insurance as well as such perquisites as corporate cars, in-house sports facilities, subsidized corporate dining rooms, child care, first-class travel, low-interest loans, charitable gift matching programs, and so forth. Compensation that is taxed at lower effective tax rates includes pension contributions, nonqualified deferred compensation plans, life insurance, and stock options. High-income individuals who are self-employed or are part of a corporation's senior management can have substantial discretion about the form of their compensation. More generally, the market will adjust the form of compensation in response to tax changes even for those employees who do not directly shape their own compensation arrangements.

Compensation for labor services is only part of total income. Income from assets provides further opportunities for taxpayers to adjust to changes in tax rates. Salaries and wages constitute about 75 percent of AGI for taxpayers as a whole but only about 45 percent for taxpayers with AGIs over $200,000. For these high-income individuals, interest and dividends are 15 percent of AGI and capital gains are an additional 15 percent. Income from rents, unincorporated businesses, and subchapter S corporations makes up a substantial part of the rest.

High marginal tax rates encourage individuals to invest their assets in ways that reduce the portion of the return that is included in taxable income. Bonds and high-dividend stocks are reduced in favor of untaxed municipal bonds, stocks with low dividends and higher potential capital gains, life insurance and annuity products in which funds accumulate tax-free, and real estate investments (or other operating businesses) in which cash flow is tax-free and rising asset values are taxed as capital gains.[3] High marginal tax rates on capital gains also cause reductions in the sale of stock and the recognition of taxable capital gains.[4]

These variations in labor supply, in the forms of compensation, and in the structure of portfolio investments can reduce adjusted gross income in response to higher marginal tax rates. In addition, higher levels of deductions for mortgage interest, investment interest,

[3] Feldstein (1976) shows that marginal tax rates have a substantial effect on the shares of portfolios invested in different types of assets.

[4] On the effects of tax rates on the realization of taxable capital gains, see Feldstein (1983, chaps. 10–13), Lindsey (1987*a*), Auerbach (1988), and Congressional Budget Office (1988).

charitable contributions, health insurance, and so forth can reduce taxable income further when tax rates rise.[5]

Taken together, existing tax rules provide substantial opportunity for individuals to reduce their taxable incomes by adjusting their income and expenses in response to high marginal tax rates. In addition, high marginal tax rates may induce taxpayers to take more "aggressive" interpretations of tax rules (e.g., claiming questionable deductions) or even to evade taxes by understating income or claiming unjustified deductions.

Previous studies have identified the sensitivity of some of the components of income and expenses to marginal tax rates. The current study examines the extent to which taxable income as a whole responds to changes in marginal tax rates.

II. A Panel of Individual Income Tax Returns

The use of an actual panel of individual tax returns permits comparing the taxable incomes and other tax return variables for the same individuals before and after 1986. The Treasury Department produced a nonstratified random sample of all tax returns. For each tax return in each year, the available data include essentially all the information from form 1040 and some additional information from the other personal income tax forms and schedules that are filed with form 1040. The current analysis compares tax returns for 1985 (before the 1986 reductions were enacted or widely anticipated) and for 1988, the most recent year for which such matched data are available.

Such a panel of tax returns has many advantages over the types of data used in earlier studies.

The use of tax return data rather than of a household survey permits analyzing the response of taxable income as a whole and not just of labor force participation and working hours. A panel, in which each individual is observed both before and after the change in tax rates, permits a "differences-in-differences" form of estimator that identifies the tax effect in a way that is not available with a single year's cross section.[6]

[5] There is substantial evidence on the sensitivity of these deductions to marginal tax rates. See, e.g., Rosen (1985) and Poterba (1990) on mortgage borrowing, Feldstein and Clotfelter (1976) on charitable contributions, and Taylor and Wilensky (1983) and Gruber and Poterba (1993) on health insurance.

[6] Single cross sections of tax returns have been useful for studying how marginal rates affect actions such as charitable giving and capital gains realizations because individual incomes and taxpayer marginal tax rates can be taken as given. Single cross sections have also been useful for studying the labor supply of married women because differences in their husbands' incomes provide the identifying source of variation in marginal tax rates.

Although Lindsey (1987*b*) did not have panel data, he developed a powerful way to use two separate cross-section samples of tax returns to approximate the differences-in-differences method of studying the effect of changes in tax rates. To study the effect of the 1981–83 reduction in tax rates on taxable incomes, Lindsey ranked the individual taxpayers by adjusted gross income in the 1979 Treasury public-use sample of individual tax returns and then did the same for the taxpayers in the 1982 sample of individual tax returns. The critical assumption in the Lindsey analysis is that the taxpayers in the successive fractiles corresponded to essentially the same individuals in both years. Conditional on this assumption, he estimated an elasticity of taxable income with respect to the marginal net-of-tax rate (i.e., the net-of-tax income per marginal dollar of pretax income) by relating the changes in the average taxable incomes of individuals in successive fractiles to the changes in their marginal net-of-tax rates. Lindsey's analysis implied a very large elasticity of taxable income to this tax variable. I shall return to a discussion of this estimate in Section IV below.

Eissa (1995) used a related method with Current Population Survey data to compare the effect of the 1986 Tax Reform Act on the labor supply of married women with high-income husbands (for whom the 1986 Act implied a substantial reduction in marginal tax rates) with the change in labor supply of women whose husbands were at the seventy-fifth percentile of income (for whom the 1986 Act implied only a small reduction in marginal tax rates). Her analysis also found a very substantial elasticity of labor supply with respect to the net-of-tax share implied by the marginal tax rates. Feenberg and Poterba (1993) also used unrelated cross sections to study how the adjusted gross income of the top 0.5 percent of taxpayers varied over time. Their analysis showed a very substantial jump in the pretax income of this very high income group just after the tax rate reduction enacted in 1986, suggesting that much of the recorded rise in the incomes of high-income individuals in the 1980s was due to the changes in tax rules rather than to a more fundamental shift in the rewards available to these highest-income earners. Feenberg and Poterba did not estimate the changes in taxable income and did not try to analyze how much of the post-1986 rise in the highest incomes was due to changes in taxpayer behavior and how much of it was due simply to different accounting rules.[7]

[7] For example, after the Tax Reform Act of 1986, many high-income individuals who had previously had subchapter C corporations converted them to subchapter S corporations. Since the income of C corporations is excluded from personal tax returns whereas the income from S corporations is included, the result could be a substantial rise in reported individual income with no change in actual income.

Although the Lindsey, Eissa, and Feenberg-Poterba comparisons of separate cross sections provide much useful information, a concern remains about the extent to which the individuals in the same fractile (or husband's income group) in successive cross sections are comparable.

The panel data of individual tax returns avoid these problems by permitting the same individuals to be followed over several years. There are some disadvantages, however. Because the panel sample is an unstratified random sample, the number of high-income taxpayers is relatively small. There is also some attrition in the sample over time as some lower-income individuals become nontaxable and as some single individuals who marry cease to be the primary taxpayer on the return. Although this unusual type of panel data attrition is nonrandom, it is likely to have relatively little effect on the middle- and upper-income married taxpayers who are the focus of this study.

The income of a taxpaying unit can be substantially affected by changes in marital status through marriage, divorce, or the death of a member of the couple. This paper therefore focuses on the largest marital status subgroup, those taxpayers who were married and filed a joint return in both 1985 and 1988.[8] Since retirement also causes a substantial change in income, the analysis excludes taxpayers who were over age 65 in 1988.[9]

Despite the unstratified character of the sample and the focus on nonaged taxpayers who were married in 1985 and 1988, the final sample (even after other deletions described below) has 3,538 medium-income taxpayers (with 1985 marginal tax rates between 22 percent and 38 percent), 197 high-income taxpayers (with 1985 marginal tax rates of 42–45 percent), and 57 highest-income taxpayers (with 1985 marginal tax rates of 49 or 50 percent).

III. The Tax Reform Act of 1986

The Tax Reform Act of 1986 combined sharp reductions in high marginal tax rates with base-broadening changes in tax rules. The combination was designed to be approximately revenue neutral and distributionally neutral if there were no behavioral response to the

[8] A similar analysis was carried out for taxpayers who were single in both 1985 and 1988. The results (which are not presented in the paper) are broadly similar to those presented for the "always-married" taxpayers but are more difficult to interpret because a significant fraction of individuals who were single in 1985 were no longer single in 1988.

[9] An analysis that includes those over 65 (presented in the earlier NBER Working Paper no. 4496 version of this paper) gives quite similar results.

tax changes.[10] To increase the political appeal of the tax proposal, the tax changes were actually structured so that tax revenue would decline in each broad income class (assuming no behavioral response) and so that the resulting revenue shortfall would be made up by an increase in the corporate income tax.[11] An increase in the "standard deduction" and in the personal exemption caused a substantial number of low-income taxpayers to have no taxable income.

The changes in the tax rules that accompanied the tax rate reductions mean that precautions must be taken in comparing incomes in 1985 and 1988. Four such changes are noteworthy.

First, adjusted gross income in 1985 excluded 60 percent of realized capital gains. That exclusion was eliminated by the Tax Reform Act of 1986. This paper presents comparisons among different tax brackets both of "full AGI," which includes all capital gains in both years, and of "AGI excluding capital gains," which focuses on the portion of income that experienced the marginal tax rate reduction. Both measures indicate a substantial response of income to the reduction in marginal tax rates. Subsequent comparisons of taxable income are based on income excluding all capital gains.

Second, before 1986 some individuals used subchapter C corporations, which permitted them to pay lower rates of tax than the individual income tax, especially on profits below $100,000. The desirability of such corporations was substantially reduced (primarily by the legislative repeal of the so-called general utilities rule) in the Tax Reform Act of 1986. The standard practice after 1986 was for individuals who had used subchapter C corporations to convert them to subchapter S corporations, causing the previously excluded corporate income to appear on their personal tax returns (in the same way that partnership income is treated). A failure to take this into account in an analysis of the tax change could lead to an overestimate of the rise in income between 1985 and 1988. Since there is no way to obtain 1985 subchapter C incomes, the present analysis eliminates all taxpayers who adopted a subchapter S corporation between 1985 and 1988.

[10] See Fullerton (1994) for a very good analytic discussion of the Tax Reform Act of 1986. See also the discussion in Feldstein (1994).

[11] The corporate tax was increased by eliminating the investment tax credit and lengthening depreciation lives. This had a positive temporary effect on the value of existing capital investments in equipment and business structures while reducing the net-of-tax return on investments in depreciable business capital in the future. Since corporate stock and business capital more generally are primarily owned by high-income individuals, the form of the 1986 corporate tax increase may have had adverse wealth and substitution effects on the labor supply of higher-income individuals. To the extent that this is true, the elasticities of taxpayer behavior with respect to tax changes that are reported in Sec. VI below will understate the effect of individual marginal tax rates.

Third, the 1986 tax reforms provided that certain "passive losses" (e.g., losses in excess of $25,000 on real estate partnership investments) could no longer be used to offset (i.e., "shelter") other income. Although there was a sharp decline in such investments after 1986, much or all of this decline might have occurred because of the fall in marginal tax rates even if passive losses had not been disallowed. The basic economics of such tax shelter investments made sense when taxpayers faced 50 percent marginal tax rates, but not at the substantially lower marginal rates that prevailed after 1986.

The analysis that follows presents two alternative ways of dealing with this change in passive losses. The first assumes that the reduction in tax losses is the result of the lower marginal tax rates whereas the other goes to the extreme of assuming that none of the reduced use of passive losses was due to lower tax rates but must be attributed to the new rules disallowing the use of such losses. The first therefore makes no special adjustment for losses; the second redefines taxable income by adding all losses to taxable income in both 1985 and 1988, implicitly assuming that the reduction in losses between 1985 and 1988 was the result of changes in tax rules and not a response to the lower marginal tax rates.[12]

Fourth, the link between AGI and taxable income was also modified in two ways that must be taken into account to make the taxable income values for 1985 and 1988 comparable. First, the personal exemptions and the effective zero bracket amount for nonitemizers were both increased between 1985 and 1988, implying that with no change in behavior the taxable income corresponding to any given AGI would be lower in 1988 than in 1985. Second, in 1988 (but not in 1985), taxable income is defined to be net of the zero bracket amount and the personal exemptions so that the first dollar of taxable income is subject to tax. The 1985 taxable incomes are all adjusted in the analysis that follows so that the comparisons of taxable incomes are all based on the 1988 definitions.

One final adjustment is necessary to make the modified taxable income for 1985 comparable to the taxable income that the taxpayer would report in 1988 if the taxpayer did not change his behavior. The 1985 taxable incomes are increased by the amount that the taxpayer's AGI exclusive of capital gains would have increased if it rose at the same rate as nominal personal income per capita (17.4 per-

[12] The tax return data separate partnerships with gross losses from partnerships with gross gains. The analysis in this paper adds gross (rather than net) losses to taxable income in both years. This extreme correction implicitly assumes not only that the reduction in losses was the result of the change in rules (rather than the reduction in rates) but also that all such losses were the result of tax avoidance planning and not just economic losses on ordinary business investments.

cent).[13] This adjusted 1985 taxable income will be referred to as 1985 adjusted taxable income.

With these adjustments, the differences among taxpayer groups in the change in taxable income between 1985 and 1988 should reflect changes in marginal tax rates, changes in individuals' market opportunities, and other nontax sources of change in taxpayer behavior, but not the changes in tax rules as such.[14] Moreover, the observed behavior should reflect the way in which tax rate changes alter behavior under the post-1986 tax rules with limited opportunities for tax sheltering.

IV. Analysis and Results

The analysis presented in this section relates changes in taxable incomes between 1985 and 1988 to the changes in the net-of-tax rate (i.e., the net-of-tax income per dollar of additional pretax income) between those two years. The initial panel of taxpayers was reduced by restricting observations to nonaged taxpayers who were married in both 1985 and 1988 and by eliminating taxpayers who created an S corporation between 1985 and 1988.

Table 1 summarizes the data grouped by each observation's marginal tax rate in 1985. Column 1 shows the average AGI, and column

[13] There is no independent way to verify the appropriateness of this uniform 17.4 percent baseline adjustment. The distribution of wage income became less concentrated during the 1980s, and some of this was due to technological and trade factors rather than tax incentives. However, wages affected by technology and trade factors are generally lower than those that are the focus of the current analysis. Moreover, much of the change in taxable incomes is not related to changes in wage income but to changes in nonwage income, deductions, and other factors.

[14] There are of course some additional small changes in tax rules that have not been taken into account. Three deserve special mention. First, the rules for individual retirement accounts were changed so that taxpayers with AGI over $40,000 were no longer eligible for tax-deductible IRAs if they participated in an employer-sponsored pension plan. The inability to take this deduction would raise taxable incomes, but the increase would be proportionately greater for the lowest-income group of taxpayers in this study (those classified as moderate-income taxpayers) and would have a very small relative impact on the taxable incomes of the higher-income groups of taxpayers. The result is to bias down the estimated responsiveness of taxable income to changes in tax rates. The second change that is not reflected in this study is the increase in the Social Security tax rates and tax base. The combined employer-employee rate for Old Age, Survivors, Disability, and Health Insurance rose from 14.1 percent in 1985 to 15.0 percent in 1988. The maximum taxable base rose from $39,600 to $45,000, slightly less than the rise in average personal income. The increases are small, and the impact is offset to some extent by the link between future benefits and current taxes. Third, no account is taken of the alternative minimum tax (AMT) rules or of the changes from AMT to ordinary tax status among some high-income taxpayers. Since those who paid AMT in 1985 and ordinary tax in 1988 experienced a smaller marginal tax rate reduction, the analysis understates the true responses of taxable income to changes in tax rates.

TABLE 1

RESPONSE OF TAXABLE INCOME OF NONAGED MARRIED TAXPAYERS TO CHANGES IN MARGINAL TAX RATES BETWEEN 1985 AND 1988

1985 MARGINAL TAX RATE	1985 AGI ($000) (1)	OBSERVATIONS (2)	PERCENTAGE CHANGES OF				
			Net of Tax Rate (3)	Adjusted Full AGI (4)	Adjusted AGI Excluding Capital Gains (5)	Adjusted Taxable Income (6)	Adjusted Taxable Income Plus Gross Loss (7)
22	30.7	800	9.0	9.4	8.4	13.6	13.4
25	36.1	909	13.3	4.5	2.4	3.5	3.7
28	42.7	713	16.3	3.9	4.7	6.0	5.0
33	51.5	771	8.7	2.2	2.2	2.5	2.5
38	67.5	345	16.1	8.0	8.1	9.6	8.8
42	94.3	152	24.1	18.8	14.7	22.0	22.3
45	126.9	45	30.9	12.4	14.8	18.5	15.3
49	177.7	35	41.2	27.1	29.6	42.7	33.9
50	479.0	22	44.0	18.4	70.6	92.4	51.1
22–38		3,538	12.2	5.1	4.6	6.2	6.4
42–45		197	25.6	17.0	14.7	21.0	20.3
49–50		57	42.2	21.3	53.7	71.6	44.8

NOTE.—All observations pertain to married taxpayers under age 65 who filed joint tax returns for 1985 and 1988 with no age exemption in 1988. Taxpayers who created a subchapter S corporation between 1985 and 1988 are eliminated from the sample.

2 shows the number of observations in the sample for taxpayers in each 1985 marginal tax rate class. For example, the 800 taxpayers in the sample whose 1985 marginal tax rate was 22 percent had an average adjusted gross income of $30,700 in that year.

The average 1988 marginal income tax rate for this group of taxpayers was 15.0 percent, a 32 percent decline from the 22 percent marginal rate in 1985. To study taxpayer behavior it is preferable to describe the corresponding change in the net-of-tax rate, that is, in the share of pretax income that the individual would retain after tax. This net-of-tax rate increased from $1.0 - 0.22 = 0.78$ to $1.0 - 0.15 = 0.85$, an increase of only 9 percent.[15]

The percentage change in the net-of-tax rate is shown in column 3 of table 1 for each initial marginal tax rate level. The increase in the net-of-tax rate varies between 8.7 percent and 16 percent for individuals with 1985 marginal tax rates between 22 percent and 38 percent and then climbs rapidly, reaching a 44 percent increase in the net-of-tax rate for taxpayers with a 50 percent marginal tax rate in 1985.

The analysis excludes taxpayers with 1985 marginal tax rates below 22 percent for two reasons. First, many low-income taxpayers became nontaxable as a result of the 1986 tax reforms and therefore were no longer in the sample. Second, many of the low-income taxpayers who did not become nontaxable had incomes that were temporarily depressed in 1985 and recovered to a more normal level in 1988. The income gains of those lower-income individuals who remained in the sample would therefore reflect this selection and mean reversion bias.[16]

Because the sample sizes are relatively small for the top tax rate groups, calculations are presented in the lower part of the table that combine several individual 1985 marginal tax rate groups with the appropriate sample weights. Separate averages are presented for the "medium-income group" with tax rates of 22–38 percent, the high-income group with tax rates of 42 and 45 percent, and the highest-income group with tax rates of 49 and 50 percent.

Column 4 compares the "full" adjusted gross incomes of taxpayers in 1985 and 1988, defined to include the full amount of capital gains in each year. More specifically, the numbers in column 4 are calcu-

[15] This ignores the role of the Social Security payroll tax. The combined employer-employee tax rate increased from 14.1 percent in 1985 to 15.0 percent in 1988.

[16] There may still be some mean reversion tendency for both the low and high marginal tax rate groups. If the low tax rate individuals in the final sample had temporarily depressed income in 1985 or if the high tax rate individuals had temporarily increased income in 1985, the comparison of 1985 and 1988 incomes would understate the responsiveness to the tax rate changes.

lated by comparing the 1988 full AGI to the sum of the 1985 full AGI and the amount by which the 1985 AGI excluding capital gains would have increased if it had risen by the same 17.4 percent that per capita personal income rose during those years.[17]

For example, the actual full AGI of taxpayers with a 1985 marginal tax rate of 22 percent rose 28 percent between 1985 and 1988. Adjusting for the 17.4 percent rise in nongain AGI implied by the rise in personal income implies a 9.4 percent net rise in adjusted full AGI.

The net rise in adjusted full AGI of the lowest five marginal rate groups varied between 2.2 percent and 9.4 percent with a weighted average (shown at the bottom of the table) of 5.1 percent. The relative net rise in adjusted full AGI then increases sharply to reach 21 percent among taxpayers with 1985 marginal tax rates of 49 percent and 50 percent. Thus while lower-income taxpayers, whose net-of-tax rates rose relatively little, saw their adjusted full AGI levels rise by only a little more than real income per capita in the economy as a whole, the higher-income taxpayers whose net-of-tax rates rose substantially saw their adjusted full AGI rise by 12–27 percentage points faster than per capita personal income.

Because the Tax Reform Act of 1986 did not reduce marginal tax rates on capital gains in the same way that it did for other income, to study the effect of lowering marginal tax rates it is appropriate to focus on income excluding capital gains.[18]

Column 5 shows the net rise in adjusted AGI excluding capital gains between 1985 and 1988.[19] Because capital gains are not large relative to the rest of AGI for taxpayers with incomes below the very highest tax groups, the figures in column 5 are almost identical to the net changes in adjusted full AGI (col. 4) except for the very highest marginal tax rate group. The overall pattern of the net changes in adjusted AGI excluding capital gains shows very small increases in the groups for which the tax rate changes are small followed by much larger changes that increase monotonically with the relative size of the tax rate change.

The revenue consequence and the deadweight loss effect of reducing marginal tax rates depend on what happens to taxable income rather than to adjusted gross income. Column 6 shows the percentage

[17] If FAGI85 denotes the full AGI for 1985 (including all capital gains) and AGI × CG85 denotes the AGI for 1985 excluding all capital gains, the figures in col. 4 show 100[FAGI88/(FAGI85 + 0.174AGI × CG85) − 1].

[18] Although in the long run individuals might be able to substitute compensation in the form of capital gains for some ordinary income, this was unlikely to be a significant factor just two years after the Tax Reform Act of 1986 was passed.

[19] In the notation of n. 17, the figures in col. 5 represent 100{[(AGI × CG88)/(1.174AGI × CG85)] − 1}.

increases in adjusted taxable income (excluding capital gains) between 1985 and 1988. Recall that adjusted taxable income for 1985 is obtained from actual 1985 taxable income by subtracting taxable capital gains, adding an amount equal to 17.4 percent of 1985 AGI excluding capital gains (the percentage increase in per capita personal income between those years), and then using the 1988 levels of the personal exemption and the standard deduction for nonitemizers. Adjusted taxable income for 1988 equals actual 1988 taxable income minus capital gains.

Although the percentage increases in adjusted taxable income vary somewhat erratically among the individual 1985 marginal tax rate groups, the overall general pattern is quite clear. The average increases in adjusted taxable income rose from 6 percent (relative to the 17.4 percent baseline increase that is part of the definition of *adjusted* taxable income) for taxpayers with 1985 marginal tax rates below 40 percent to 21 percent for taxpayers with 1985 marginal tax rates of 42–45 percent and to 72 percent for taxpayers with 1985 marginal tax rates of 49 percent and 50 percent.

In column 8 of table 1, gross partnership losses are added to adjusted taxable incomes. As noted in Section III, this would be appropriate only if the entire decline in partnership losses between 1985 and 1988 had been due to the changes in rules governing the taxpayers' ability to offset other income with such partnership losses but is not appropriate if the reduction in the use of such partnership losses was in whole or in part a response to the lower post-1986 tax rates themselves. A comparison of columns 6 and 7 shows that the changes in adjusted taxable income (col. 6) and in adjusted taxable income plus gross partnership losses (col. 7) show that partnership losses were not at all significant for taxpayers with 1985 marginal tax rates below 45 percent. Since partnership losses generally declined between 1985 and 1988, the addition of these losses for both years reduces the percentage increase in income between 1985 and 1988 for the taxpayers with marginal tax rates of 45 percent and higher. But even with this reduction, the income increases are substantially higher for the taxpayers in the groups with 1985 marginal tax rates of 42–49 percent than they are in the lower marginal tax rate groups.

V. Elasticities of Taxable Income with Respect to Net-of-Tax Rates

The evidence presented in Section IV implies substantial elasticities of taxable income with respect to the net-of-tax rates. Table 2 presents estimates of these elasticities using a differences-in-differences

TABLE 2

ESTIMATED ELASTICITIES OF TAXABLE INCOME WITH RESPECT TO NET-OF-TAX RATES

Taxpayer Groups Classified by 1985 Marginal Rate	Net of Tax Rate (1)	Adjusted Taxable Income (2)	Adjusted Taxable Income Plus Gross Loss (3)
	Percentage Changes, 1985–88		
1. Medium (22–38)	12.2	6.2	6.4
2. High (42–45)	25.6	21.0	20.3
3. Highest (49–50)	42.2	71.6	44.8
	Differences of Differences		
4. High minus medium	13.4	14.8	13.9
5. Highest minus high	16.6	50.6	24.5
6. Highest minus medium	30.0	65.4	38.4
	Implied Elasticity Estimates		
7. High minus medium		1.10	1.04
8. Highest minus high		3.05	1.48
9. Highest minus medium		2.14	1.25

NOTE.—The calculations in this table are based on observations for married taxpayers under age 65 who filed joint tax returns for 1985 and 1988 with no age exemption in 1988. Taxpayers who created a subchapter S corporation between 1985 and 1988 are eliminated from the sample.

method, that is, by comparing the differences in the percentage change in taxable income between pairs of marginal tax rate groups to the differences in the percentage change in the net-of-tax rates between the same groups.

This method implicitly assumes that there is a relation between the percentage change in taxable income between 1985 and 1988 and the percentage change in the net-of-tax rate with a common "constant term" that does not differ between marginal tax rate groups. The differencing eliminates the common constant term and provides an estimate of the slope term. Since both changes are measured as percentages, this slope coefficient is an estimated elasticity.[20]

Consider for example the comparison of the middle and high marginal tax rate groups. The net-of-tax rate increased by 12.2 percent for the first group and by 25.6 percent for the second group (shown

[20] John Navratil has repeated this analysis for the years 1983 and 1985, when there were no changes in tax rates or tax rules, to see whether there is any systematic tendency for higher marginal tax rate individuals to experience relatively greater income increases. He found no evidence of faster income growth among higher marginal tax rate groups, confirming that the patterns reported in tables 1 and 2 are due to the 1986 tax reforms.

in rows 1 and 2 of col. 1 of table 2), a difference of 13.4 percentage points (shown in row 4 of col. 1). The corresponding increases in the adjusted taxable incomes for the two groups were 6.2 percent and 21.0 percent, a difference of 14.8 percentage points; these are shown in column 2. Comparing this difference in the adjusted taxable income increase to the difference in the net-of-tax rate increase implies an elasticity of 1.10; this is shown in row 7.

Similar calculations based on the comparison of the high marginal tax rate group (with 1985 marginal tax rates of 42–45 percent) with the highest marginal tax rate group (with 1985 marginal tax rates of 49 and 50 percent) indicate a much higher elasticity of 3.05. An overall elasticity based on comparing the middle marginal tax rate group and the highest group is 2.14.

Adding the gross partnership losses to adjusted taxable income lowers these estimated elasticities to 1.04, 1.48, and 1.25. Since some and perhaps all of the reduced use of partnership tax losses to offset other income reflects the reduction in marginal tax rates rather than the special rules disallowing partnership losses, the true elasticities probably lie between the limits shown in columns 2 and 3.

These elasticity values are quite similar to the estimates obtained by Lindsey (1987*b*), the only other published estimates of the elasticity of taxable income with respect to the net-of-tax rate. The similarity is striking since Lindsey's estimates are based on a different historic episode (the 1982–84 tax cuts) and a different method of estimation (nonpanel tax return data). Lindsey reported a variety of different elasticity estimates but concluded that "under the constant elasticity specification the elasticity of taxable income to after-tax share ranges from 1.05 to 2.75 with most of the data suggesting an elasticity between 1.6 and 1.8" (p. 197). When Lindsey allowed his elasticity estimate to vary with income, he also found that higher-income taxpayers appear to have higher elasticities. The generally higher elasticity values in the Lindsey analysis may reflect the fact that in 1982 there were many opportunities to shelter income through tax losses, and part of the observed response was a reduced use of those shelters.

More recently, Gerald Auten and Robert Carroll of the Treasury Department's Office of Tax Analysis repeated the analysis of this paper using a much larger panel of tax returns that is not available to researchers outside the Treasury. This panel of 14,425 taxpayers between 1985 and 1989 had more than 4,000 taxpayers with 1985 marginal tax rates of 49 percent or 50 percent. Auten and Carroll (1994) report an elasticity based on adjusted taxable income plus losses of 1.19 with a standard error of 0.15. The value of 1.19 is very close to the average of the three elasticities reported in table 2 (1.04, 1.48, and 1.25).

VI. An Application to the 1993 Tax Rate Increases

The estimated elasticity of taxable income that was discussed in Section V can be used to approximate the potential revenue effect of the increase in personal tax rates that was enacted in 1993. The legislation raised the marginal rate of income tax only on incomes over $140,000,[21] increasing the rate from 31 percent to 36 percent between $140,000 and $250,000 and then to 39.6 percent on incomes over $250,000. The legislation also removed the existing $135,000 ceiling on the Medicare (HI) payroll tax base. Since the Medicare tax is a combined 2.9 percent divided equally between employers and employees, the combined effect of the two changes is basically to raise the personal tax rate from 31 percent to 39 percent between $140,000 and $250,000 and to 42 percent above $250,000.[22]

These tax rate changes reduced the net-of-tax income per dollar of gross income from 69 percent to 61 percent for taxpayers with incomes under $250,000 and from 69 percent to 58 percent for taxpayers with incomes over $250,000, reductions of 11.5 percent and 15.9 percent, respectively.

An analysis of two representative high-income taxpayers shows that the estimated elasticities imply that the recent legislation is likely to produce little additional tax revenue.

Consider first a couple with taxable income of $180,000, the level of income that the Clinton administration identified as the median taxpayer income among those who would experience an increased tax rate (White House 1993). With no behavioral response to the higher marginal tax rates, the proposed tax changes would raise $2,000 of additional personal income tax (5 percent of the $40,000 of income between $140,000 and $180,000) and $1,305 of additional HI payroll tax (2.9 percent of the $45,000 of income between $135,000 and $180,000),[23] for a total revenue gain by the Treasury of $3,305.

The tax rate increases represent an 11.5 percent reduction in the net-of-tax rate, from 69 percent to 61 percent. The elasticity estimates presented in Section V range from a low of 1.04 to a high of 3.05. Even the elasticity of 1.04 implies that the 11.5 percent decline in the net-of-tax share would induce a 12 percent decline in taxable income,

[21] This is true for married taxpayers filing jointly. The analysis in this section uses the specific provisions of the law for each taxpayer group.

[22] This discussion draws on Feldstein and Feenberg (1993).

[23] This assumes that there is a full $45,000 of wage and salary income in excess of $135,000 per individual. If the couple contained two wage earners and each had less than $135,000 of income subject to the HI tax, the proposed extension of the HI tax base would not raise any additional revenue.

from $180,000 to $159,000. Because of the structure of the proposed tax increase, this decline in taxable income would cause an actual decline in the amount of tax paid. This revenue loss occurs because the $21,000 reduction in taxable income (from $180,000 to $159,000) reduces current revenue by $6,510 (at the 31 percent existing marginal rate) whereas the 5 percent increase in the personal tax rate on the $19,000 (between $140,000 and $159,000) raises only $950 in revenue and the 2.9 percent HI tax on the $24,000 (between $135,000 and $159,000) raises only $696, for a total of $1,646. The difference between the $6,510 revenue loss and the $1,646 revenue gain implies a net loss to the Treasury of $4,864 for this representative high-income taxpayer.[24]

The revenue effect of the new legislation increases as income rises. Consider, therefore, a couple with $500,000 of taxable income. With no behavioral response, this couple would pay $37,585 more in taxes under the current tax rates than under the pre-1993 tax rates. But even with the lowest elasticity of 1.04, the 16.5 percent decline in the net-of-tax share implies a 17 percent decline in taxable income, from $500,000 to $415,000. The net revenue gain to the Treasury would be only $1,460, or less than 0.5 percent of the initial taxable income.[25]

Although no attempt will be made here to compare the deadweight loss of the higher tax rate with this relatively small revenue increase, it should be noted that raising the marginal tax rate from 31 percent to 42 percent would increase the deadweight loss of the tax by approximately 80 percent.[26]

The higher tax rates in the 1993 legislation produce little or no additional revenue because there is no increase in tax rates on the first $140,000 of income. A relatively small reduction in total taxable income therefore represents a substantial proportional reduction in the part of the income that is to be taxed at a higher rate. Moreover, the taxable income that has been eliminated would have been taxed

[24] This calculation ignores the small income effect associated with the tax rate increase. Since the rate increase would reduce disposable income by $3,305 if there were no behavioral response, the taxpayer would presumably work less, have fewer fringe benefits, and spend less on deductible consumption. A plausible estimate of the resulting rise in taxable income would be $1,500 or less (see Feldstein 1995). Since the tax on this at 39 percent would be $585, the Treasury would still lose more then $4,000.

[25] If the $85,000 of increased tax with no behavioral response induced an income effect that raised taxable income by as much as $40,000, the additional tax revenue at 42 percent would still be only $16,800. Combining this with the $1,460 that results without an income effect implies a total Treasury gain of $18,200, or one-fifth of the static revenue gain.

[26] Since the deadweight loss is approximately proportional to the square of the marginal tax rate, raising the marginal tax rate from 31 percent to 42 percent increases the deadweight loss by a factor of $(42/31)^2 = 1.84$.

at a rate that is high (31 percent) relative to the increases in the tax rate (7.9 percent below $250,000 and 11 percent over $250,000).

It is the structure of the tax increase, rather than the final tax rate or the degree of taxpayer responsiveness, that causes the particularly large revenue losses for most taxpayers. To see this, note that increasing a *proportional* income tax from 31 percent to 39 percent would raise substantial revenue even if taxpayers responded with an elasticity of 1.04 with respect to the 11.5 percent decrease in the net-of-tax rate. More specifically, if a taxpayer with $180,000 of taxable income now paid 31 percent on *all* of that income (a tax of $55,800), an increase in that tax rate to 39 percent would increase revenue by nearly 11 percent (to $61,776) even if pretax income fell by 12 percent to $158,400.[27]

The aggregate revenue effect of the 1993 tax rate changes can be estimated with the help of the NBER's TAXSIM model.[28] The TAXSIM model uses a stratified random sample of almost 100,000 individual tax returns provided by the Internal Revenue Service. The most recent data pertain to 1989 and have been adjusted to estimated 1993 income levels.[29]

Three caveats should be noted about applying the estimated elasticity of individual taxable income to the 1993 tax reforms. First, the effect of eliminating the $135,000 ceiling on the HI payroll tax base should probably be evaluated with an elasticity different from the response to the 1986 personal rate changes since the HI tax applies only to payroll income.[30] Second, to the extent that individuals will reduce taxable income by shifting ordinary income to deferred compensation, capital gains, insurance, and so forth, some future tax will be paid to the federal government. Finally, individuals who reduce their taxable income in ways that simultaneously increase the taxable income of their employers (e.g., by nonqualified retirement programs) may reduce the government's total tax collection by less.

With no behavioral response, the TAXSIM model implies that the

[27] The income effect would raise revenue by approximately an additional $1,000, bringing the total revenue gain to about $7,000 in contrast to the net loss of more than $4,000 when the tax is raised only on income over $140,000.

[28] An earlier analysis of the proposed tax changes that were eventually enacted was reported in Feldstein and Feenberg (1993). That analysis was done before the current elasticity estimates were available and assumed somewhat lower estimates than even the lowest value estimated in this sample.

[29] The TAXSIM model has been modified to analyze the extension of the 2.9 percent payroll tax to incomes above $135,000. To calculate the increase in the HI tax base for each tax return, I use a statistical method to divide the 1989 wage and salary income (from line 1 of tax form 1040) between the two spouses in a way that reproduces the relation between spouses' incomes in the 1989 Current Population Survey.

[30] The appropriate elasticity might be higher if individuals could easily convert payroll income to some other form of taxable compensation.

tax rate changes enacted in 1993 would raise tax liabilities by $25.0 billion at 1993 income levels. If, however, taxable income declines by 12 percent for individuals with incomes between $140,000 and $250,000 and by 16.5 percent for individuals with incomes over $250,000 (i.e., by the amounts implied by the lowest estimated elasticity [1.04] of taxable income to net-of-tax rates), tax revenue would increase by only $1.6 billion.

VII. Concluding Comments

The evidence presented in this paper shows a substantial response of taxable income to changes in marginal tax rates. The elasticity estimates are obtained by using panel data that trace the tax returns of the same individuals before and after the 1986 Tax Reform Act. The differences-in-differences calculation based on tax returns for 1985 and 1988 grouped by 1985 marginal tax rates implies an elasticity of taxable income with respect to the marginal net-of-tax rate that is at least one and could be substantially higher.

If the long-run response to a change in marginal tax rates is greater than the short-run response (e.g., because it involves changes in occupation, location, education, etc.), this analysis of only two years' experience after the 1986 tax rate changes may understate the long-run sensitivity of taxable income to changes in tax rates.

The estimated response of taxable income is not the same as an estimate of the response of labor supply to changes in tax rates. Taxable income can be changed by varying not only labor supply but also the forms of compensation, the investment of assets, and the extent of spending on tax-deductible activities.

The estimated response of taxable income with respect to changes in tax rates has important implications for estimating revenue and for the design of tax and budget policy. For example, the lowest estimated elasticity implies that the tax rate changes enacted in 1993 will lead to little or no additional personal income tax revenue despite the very substantial increase in marginal tax rates. It follows that these tax rates could be reduced to their pre-1993 levels with little or no revenue loss.

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